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Determinants of Internet and Cell Phone Banking Adoption in South Africa

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Abstract

More and more banks are turning to self-service technologies to provide customers with many channels to access products and services. Internet and cell phone are some of the least cost and increasingly popular financial services delivery channels. In developing countries though, the level of information and communications technology development, the cost of Internet and the limited bandwidth of mobile networks and other access technologies constrain such innovation. In this paper, we explore the factors that affect Internet and Cell Phone banking adoption in South Africa. We also compare the differences in the perception of Internet banking and cell phone banking and the influence factors. The findings indicate that both the adoption intent and the perception of Internet banking users differ markedly from cell phone banking users. The results are discussed and some implications for banks are outlined.

1. Introduction

The purpose of this paper is to compare the perceptions of Internet banking and cell phone banking adoption in South Africa. South Africa is a middle-income developing country. This context offers a different perspective to that of the mainstream literature, which often assumes a developed country context. In a globalized environment, however, these multiple perspectives need all be accorded due attention.

2. Background

The banking industry is an extremely information intensive industry and remains at the forefront of advanced use of information technology. Most banks are continually looking for alternative ways of relating to customers, reduce costs, improve efficiencies, and differentiate products and services. One trend in this line is the increasing use of self-service technologies (Perumal and Shanmugam, 2004). In the past, the introduction of Automatic Teller Machine (ATMs) allowed access to some banking service on a 24/7 basis. Recently, more and more banks are relying on the Internet and cell phones to push their services to customers. For instance, a KPMG study conducted in June 2000 found that, on the average, banking services derived 13% of their revenues from online sales, and within 18 months this figure was expected to grow to 28%. (KPMG, 2000).

The increasing application of wireless technologies, of which mobile phones are just one example, has also provided banks with the opportunity to provide their services anytime and anywhere (Birch, 1999; Rahmati, 2004). In addition, it offers far greater freedom of movement, customization and personalization. A number of businesses are introducing mobile services covering the information, communication and transaction dimensions (Kumar and Zahn, 2003). To facilitate this and allow other businesses to charge for their services, many banks are introducing mobile payments and mobile access to customer accounts.

Not only the number of banks that offer Internet and cell phone banking services but also the number of customers who are using these services is spreading worldwide. Gandy (1999) reported that some 7 per cent of UK customers used Internet Banking and this was expected to rise to 28 per cent by 2004. These figures are comparable to those of Sweden, Norway and Germany (Bons, 1999). In the United States, a recent survey indicated that almost half the percentages of the Internet users are banking online (El-Khoury, 2005). Similarly, Perumal and Shanmugam, (2004) estimated some 6.1 million Internet Banking users outside Asia-pacific, United States and Western Europe. This figure was only 1.0 million in 2000.

Some of the 6.1million Internet Banking users mentioned above are in Africa, of which the majority are in South Africa. In fact, according to World Wide Worx's research report (2004), the number of online bank accounts in South Africa has surpassed the one million mark at the end of 2003 and is growing annually on the average 29%. In a similar fashion, according to ITU's African Telecommunications Indicator 2004 report, Africa is scoring the highest (65%) annual average mobile subscribers growth rate compared to the rest of the world (America- 24%; Europe ?C 35%). The rapid diffusion of cell phones and the increasing short message service (SMS) traffic offer banks in Africa and elsewhere a new and flexible channel to allow customers to view account balances, transfer funds between accounts, and pay accounts. Likewise, a number of Banks in South Africa are offering cell phone banking services via the Wireless Application Protocol (WAP) and the SMS based Wireless Internet Gateway (WIG) technologies (Brown et al, 2003).

The future growth of Internet and Cell phone Banking depends to a large extent on whether or not consumers accept and use them. Thus, much research attention has been focused on examining consumer perceptions of new information technology, and whether they intend to use it. These studies identify levers that can be used to enhance the adoption rate. The theoretical basis for much of this work has been the technology acceptance model (TAM), and the perceived characteristics of innovation (PCI) model (Plouffe et al, 2001). However, other studies on Internet banking combined theoretical frameworks based on the diffusion of innovations theory, TAM and theory of planned behaviour (Al-Sabbagh and Molla, 2004; Brown et al, 2003; Tan and Teo, 2000), reflecting the trend towards developing and using unified theories of adoption that integrate diverse sources.

In this paper we explicate the influence of attitudinal factors (relative advantage, compatibility, trialability, complexity, risk), subjective norm(social factors) and perceived behavioural control factors (self-efficacy and technological support) on the adoption of Internet and cell phone banking. We also compare the effect of attitudinal factors on the adoption of cell phone and Internet banking.

3. Research Methods

The data for the study is extracted from two studies conducted in South Africa (Brown et al 2003 and Brown et al, 2004). A total of 142 respondents participated in the study of Internet Banking where as 162 replied in the study of cell phone banking. The demographic profile of respondents in each study is shown in Table 1. Approximately 80% of the Internet banking respondents were graduates whilst only 37% of cell phone banking respondents were in this category. The banking needs of Internet banking respondents were shown to be greater than for the cell phone banking respondents, perhaps a reflection of the greater affluence of this group.

Table 1: Demographic Profile of Respondents

Characteristics	Internet		Cell Phone	
	Frequency	%tage	Frequency	%tage

Gender				
Male	90	63.4	76	48.1
Female	52	36.6	82	51.9
Age				
<20	1	0.7	1	.6
20-29	95	66.9	106	67.1
30-39	27	19	19	12
40-49	9	6.3	21	13.3
>50	10	7	11	7
Highest Education				
2nd ary school	19	13.4	39	14.1
Junior college, polytechnic	8	5.6	56	34.6
Bachelor degree	56	39.4	58	35.8
Masters Degree	11	7.7	1	0.6
MBA (enrolled)	40	28.2	--	--
Doctorate	3	2.1	1	0.6
Others	3	2.1	--	--
Income (Monthly)				
< R 2,000	59	41.5	56	34.6
>= R 2,000	78	54.9	78	48.1
Missing	5	3.5	28	17.3

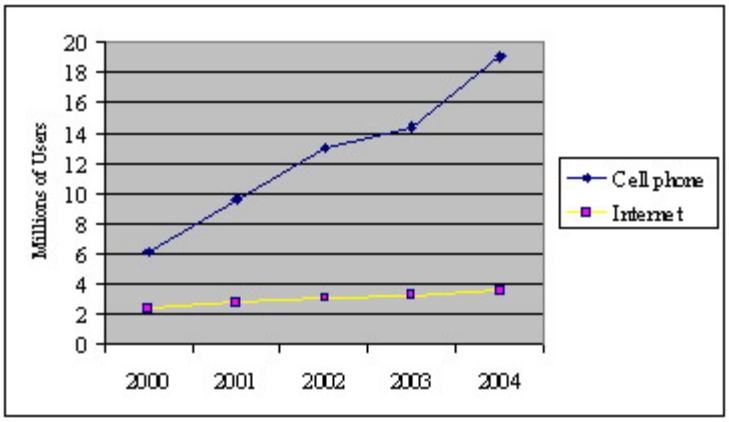
Source: Brown et al (2003), Brown et al (2004)

The Internet banking study had used a 7-point Lickert scale for the multiple-item measures, anchored by strongly disagree at one end, to strongly agree at the other. For the cell phone banking study a 5-point Lickert scale was used. The analysis proceeded first by identifying the most important and least important factors that respondents perceived as affecting their Internet and cell phone banking usage. Then a comparative analysis is performed. To facilitate the comparison, the 7-point scale was normalized to 5 points. In addition, to improve accuracy of comparison, only the constructs that were present in both studies were included in the analysis. Relative advantage, compatibility, trialability, and risk had been measured in each study with multiple items for each construct. The wording and number of items, however, differed across the studies, and thus only the items that were present in both studies were included in the analysis. T-tests were employed to identify significant differences in perception and adoption intent.

4. The Internet and Cell Phone in South Africa

The web was first directly accessible to the South African public in 1994 (Goldstuck, 2002). There was explosive growth in dial-up Internet usage between 1995 and 1998, as the number of Internet Service Providers (ISPs) mushroomed, but since then there has been a leveling off with current user numbers estimated to be about 3.5 million (UNCTAD, 2004). This represents only about 7% of the population, thus critical mass has not yet been achieved. On the other hand, cell phones were launched in South Africa in 1994 and had scored a healthy growth. Unlike the Internet, cell phone users cut across the socio-economic spectrum and are not restricted to an affluent or educated portion of the society. There are about 19 million users representing some 40% of the population. Figure 1 shows the growth of Internet and cell phone in South Africa

Figure 1: Internet and Cell Phone Users in South Africa



Data Source: ITU, Internetworldstat, CellularOnline

5. Internet and Cell Phone Banking in South Africa

Internet banking was first launched in South Africa in the late 1990s. The Internet banking users form a subset of Internet users, typically being in the upper income bracket of an already affluent and/or educated group. According to World Wide Worx's research report (2004), the number of online bank accounts in South Africa has surpassed the one million mark at the end of 2003 and is growing annually on the average 29%, thus representing about one third of Internet users, and about 9% of all banking consumers. On the other hand, cell phone banking has been available since early 1998 (E-business handbook, 2003). A recent estimate puts the number of cell phone banking users at about 100,000 ?C less than 1% of cell phone users, and a similarly small percentage of bank account holders. An additional barrier to cell phone-banking adoption is the limited use made of cell phone data services. It is still primarily used as a voice communication device, although text messaging has rapidly risen in popularity. Table 2 shows that extent of use of different channels to do banking.

Table 2: Frequency of use of alternative banking channels

	Bank hall	ATM	Store/shop	Telephone	Internet	Cell phone
Never (1)	56	16	100	134	129	138
Seldom (2)	46	19	10	7	7	3
A few times monthly (3)	26	47	16	4	11	2
Weekly (4)	11	29	12	1	3	2
A few times a week (5)	19	37	13	4	5	1

Daily (6)	4	14	11	12	7	16
Average frequency of use (1-Never, 6-Daily)	2.4	3.6	2.1	1.6	1.6	1.6

The data in table 2 is extracted from the cell phone banking survey only. The result shows that Cell phone, telephone and Internet are the least frequently used channels for accessing banking services. On the other hand ATM is the most frequented banking channel. This is an interesting finding and could be related to the acceptance level of recently introduced channels and the perceived risk associated with them.

5.1 Factors that affect Internet and cell phone banking adoption

In order to identify the top and least five perceived items in affecting the adoption intention of Internet and cell phone banking, we computed the mean score of the respondents?? replies. Table 3 provides the result.

Table 3: Most and Least Perceived Factors in Internet and Cell Phone Banking Adoption

Internet Banking (Seven point lickert scale. 1-strongly disagree to 7-strongly agree)		Cell Phone (Five point lickert scale. 1-strongly disagree to 5-strongly agree)	
Items	Mean	Items	Mean
Faster Internet access speed is important for Internet banking.	6.2*	I would use cell phone banking if I could use it on a trial basis first to see what it can offer	3.97
Internet banking makes it easier to do banking	6.0	I would use cell phone banking if I could see a trial demo first	3.87
Internet banking is a convenient way to manage my finances	5.8	I would use cell phone banking if I could test cell phone banking first	3.86
Internet banking is compatible with my lifestyle	5.7	I would use or be more likely to use cell phone banking if cell phone banking was compatible with my lifestyle	3.58
Using Internet banking fits into my working style	5.5	I would use or be more likely to use cell phone banking if using my cell phone to conduct banking transactions fits into my working style	3.54
Information concerning my Internet banking transactions can be tampered with.	3.3**	Cell phone banking is a risky mode of banking to use	3.18
Information concerning my Internet banking transactions will be known to others.	3.0	Cell phone banking would allow me to manage my finances more efficiently	3.18
My decision to adopt Internet banking is influenced by my family	3.0	Cell phone banking would be complex to use	2.95
Using Internet banking requires a lot of mental effort	2.7	I would use cell phone banking if cell phone banking increased my status	2.76
Internet banking is a difficult way to conduct banking transactions	2.4	Cell phone banking would require a lot of mental effort	2.58

* Bold font face indicates the top five items affecting adoption

** Italic font face indicates the least five items affecting adoption

The findings in table 3 indicate that perceived behavioral control (technology support), relative advantage

and compatibility are the major factors that appear to affect adoption of Internet Banking. On the other hand, adoption of cell phone banking appears to be influenced by its trialibility and compatibility. Regarding the least perceived items that affect Internet banking adoption, these seem to be related to complexity, subjective norm and perceived risk. Likewise, items related to the complexity, relative advantage and perceived risk of cell phone banking are perceived as factors least affecting its adoption. This exploratory result shows that while there are some common factors that affect the adoption of cell phone banking and Internet banking, there are also differences. Given this context we then set out to compare differences in perceptions and adoption intentions. The perceptions to be compared are the ones that were found to be an influence on Internet banking, cell phone banking, or both ?C i.e., Relative Advantage, Compatibility, Trialability, Risk and Complexity. Self-efficacy was not included as the measures used in each study were so different that direct comparison was not possible.

5.2. Comparison of Internet and cell phone banking

Because of the demographic differences of the Internet and cell phone users; the time differences in the launch of Internet and cell phone banking services, the differences in the technology, and users experience with these application, it is tenable to expect differences in the adoption intention and the perception of the determinants of adoption. Table 4 shows that there are statistically significant differences in the mean scores of the intention to adopt cell phone and Internet banking and the factors that affect such intention.

Table 4: Results of mean comparison

	Internet Banking	Cell Phone Banking	t-value	df	p
Relative Advantage	4.1	3.2	8.8	289	0.0001
Compatibility	4.1	3.6	5.0	289	0.0001
Trialability	3.4	3.9	-4.2	289	0.0001
Risk	2.7	3.4	-5.4	290	0.0001
Complexity	2.4	2.9	-5.7	290	0.0001
Adoption Intent	2.8	2.0	9.7	292	0.0001

Note: Scale used 1:strongly disagree; 5: strongly agree

The average relative advantage of Internet banking was greater than that for cell phone banking, with cell phone banking respondents averaging a score of 3.2, which on a scale of 1 to 5 is neutral. This difference could be due to the greater visibility and use of Internet banking amongst Internet users.

There was also a significant difference in perceptions of compatibility. The compatibility of Internet banking with user values was greater than that for cell phone banking. This difference could be due to the fact that a typical Internet user is accustomed to using the Internet at home and work for informational, communicational and transactional purposes. For a typical cell phone user, cell phone banking may not be as compatible with values, given that the cell phone is seen primarily as a communication device, rather than to be used for banking and financial transactions.

For trialability, the cell phone banking respondents scored higher, indicating the lower awareness and feel of cell phone banking. Because cell phone banking is a relatively recent innovation that hasn't yet widely diffused, users would prefer to try it to see its advantage and features. In like manner, the risks associated with cell phone banking and its complexity was perceived to be relatively higher than Internet banking. This difference could be because of the lack of familiarity with cell phone banking amongst many cell phone users?C i.e., the fear of the unknown and the size of cell phones respectively.

Finally, the average adoption intent for Internet banking was positive (2.8, on a scale of 1 to 3), whereas for cell phone banking it was neutral (2 on a scale of 1 to 3). This again reflected the greater awareness and familiarity with Internet banking and its greater use within the Internet community, as compared to the low levels of use of cell phone banking amongst cell phone users

6. Discussion and Implication

This study indicates that both the adoption intent and perceptions of Internet banking amongst Internet users differ markedly from cell phone banking amongst cell phone users. This implies that success with one channel cannot be automatically translated into another channel, as the demographic profile and social context for each innovation differs. Therefore there is a need for providers of these services to take the adoption context into account. As indicted in figure 1, there are far more cell phone users than the Internet users in South Africa. In addition the demographic profile of cell phone users cut across economic and social groupings. It might then be argued that cell phone banking is a channel that can spread banking services to the previously unbanked portion of the society. However, the slow uptake of cell phone banking defies this logic. The results of this analysis furthermore confirm the lukewarm response to cell phone banking, especially when compared against Internet banking.

Differing perceptions and intentions to adopt the innovations may be as a result of the social context in which the Internet and cell phone respectively are used, and relatedly the characteristics of the typical user of each. There is support for this assertion from diffusion of innovations theory, where it is noted that the social system in which the innovation exists influences the process of adoption (Rogers, 1995). According to the demographic findings (Table 1), while Internet banking users fit the archetypal Internet user - young, educated and/or middle and high income, cell phone users cut across different age, educational and economic groupings. Many cell phone users use the cell phone as primarily a communicative device, and thus this perception needs to firstly be addressed. New generation cell phones with added functionality such as web access are changing this, and will continue to do so as they begin to diffuse more widely. The average cell phone user earns a smaller income than a typical Internet user, which means many don't qualify for some banking products such as cheque accounts, credit cards, and mortgages. The primary need is for a savings account, and the ability to deposit and withdraw funds. Thus, Banks that simply duplicate services available on the Internet to cell phone banking will not add much value. Those services might suit the upper income Internet user, but not the typical cell phone user. (Manson, 2003)

The result also shows that Cell phone banking users need more time to try the technology before accepting it. Cell phone banking in South Africa as it stands now may be suitable to attract current Internet banking users, who are looking for a convenient channel, compatible with a busy lifestyle, in which there is little time to be visiting bank halls or ATM machines. However to distribute banking services to the less affluent part of the society, banks need to offer more time to try the service. They need to put in place strategies that showcase this application and give potential users hands on experience.

7. Conclusion

Internet banking and cell phone banking are both fairly recent innovations in South Africa. However, the success of cell phone banking has not mirrored that of Internet banking, despite the far greater success of cell phone use as compared to Internet use. This study shows that perceptions of Internet banking are more positive amongst Internet users, than of cell phone banking among cell phone users, which explains the lower levels of cell phone banking adoption.

The findings point to the need for providers of cell phone banking to consider closely the social context of the innovation, and the subsequent banking needs of the typical user. If these needs are well understood, appropriate banking services can be delivered via cell phone. Another challenge that needs to be addressed is the perception of the cell phone as a communicative device, rather than a multi-purpose machine that could also be used for conducting financial transactions. Newer model cell phones are perhaps bringing this change about. In all, therefore, cell phone banking holds promise for reaching critical mass, but only if the social context of cell phone users and their banking needs are clearly understood.

The study has some limitations that need to be considered in the interpretation of the result. First the data is extracted from two different studies, which didn't strictly use identical measures. As a result some

important constructs has to be removed from the comparison. More rigorous study is required to have a full understanding of the differences in perception of technological, behavioural and organisational factors in cell phone and Internet banking adoption. Second, the analysis was limited in comparing the differences and didn't cover why the factors of influence differed. This is one area that can be extended in future research. Third the studies were conducted using a different set of respondents in each case. This was appropriate; as for Internet banking the target population were Internet users with bank accounts, whereas for cell phone banking, it was cell phone users with bank accounts. Future research might then look at targeting users of both Internet and cell phones that happen to have bank accounts. Thus, the perceptions and adoption intent for both innovations could be ascertained from the same set of respondents at the same time.

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